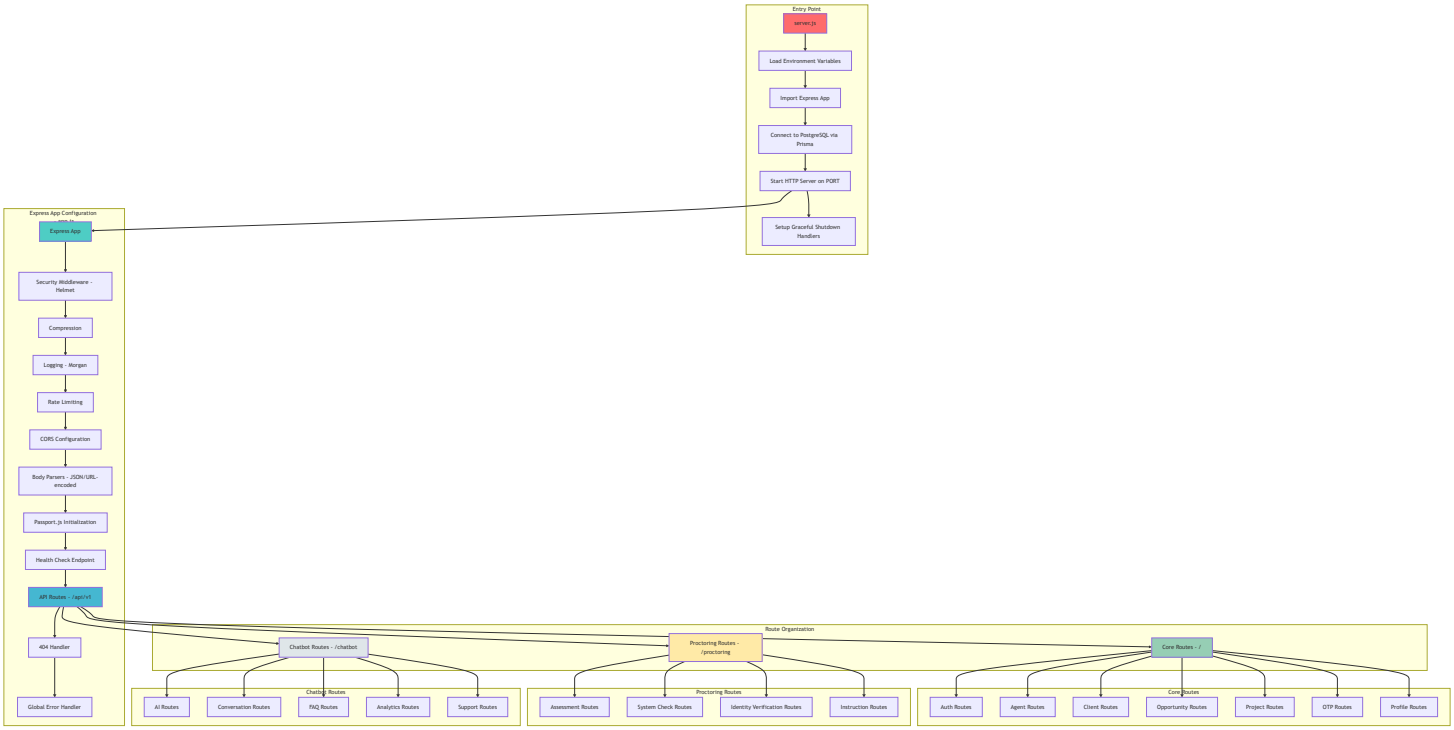
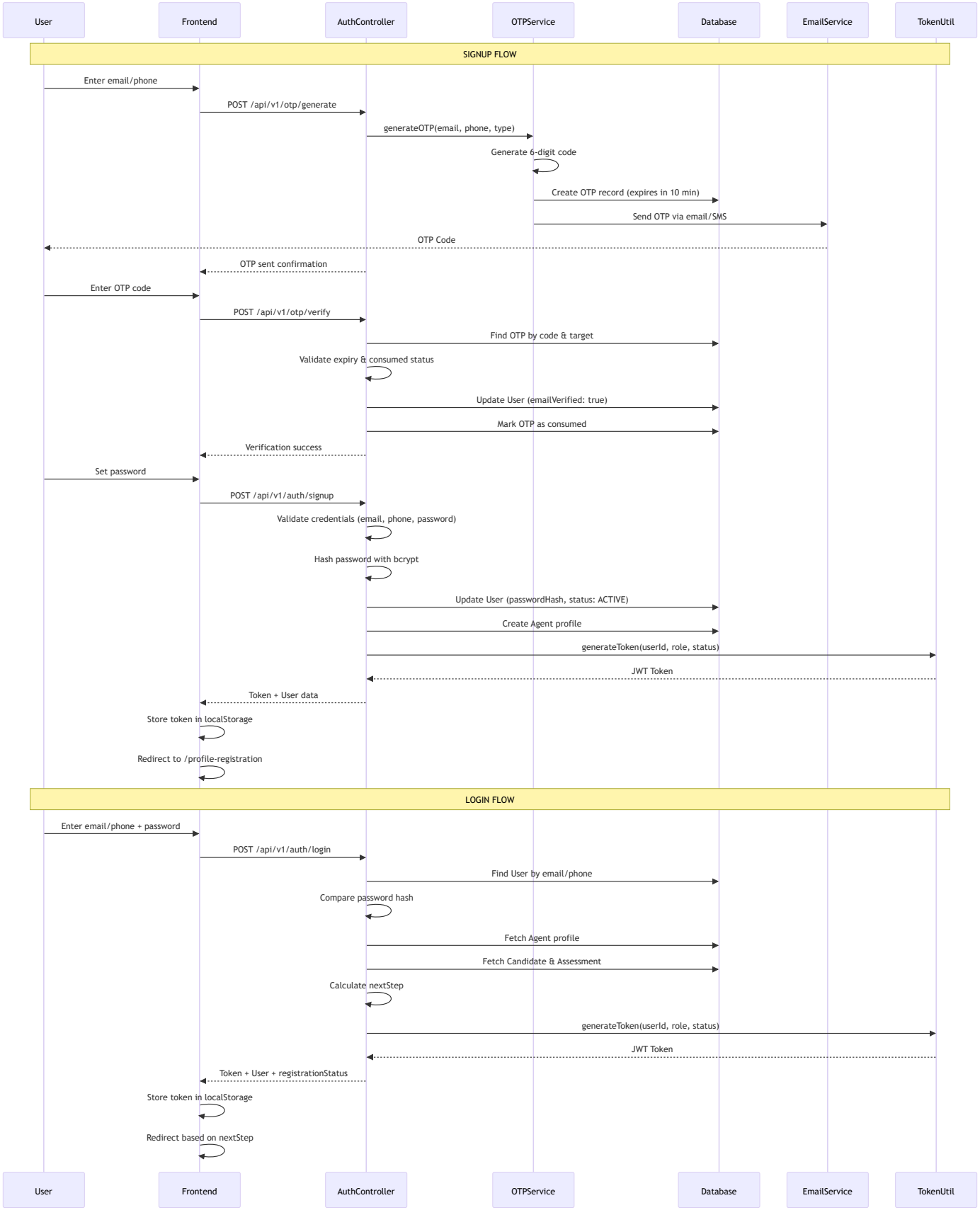
Backend Architecture Flowcharts

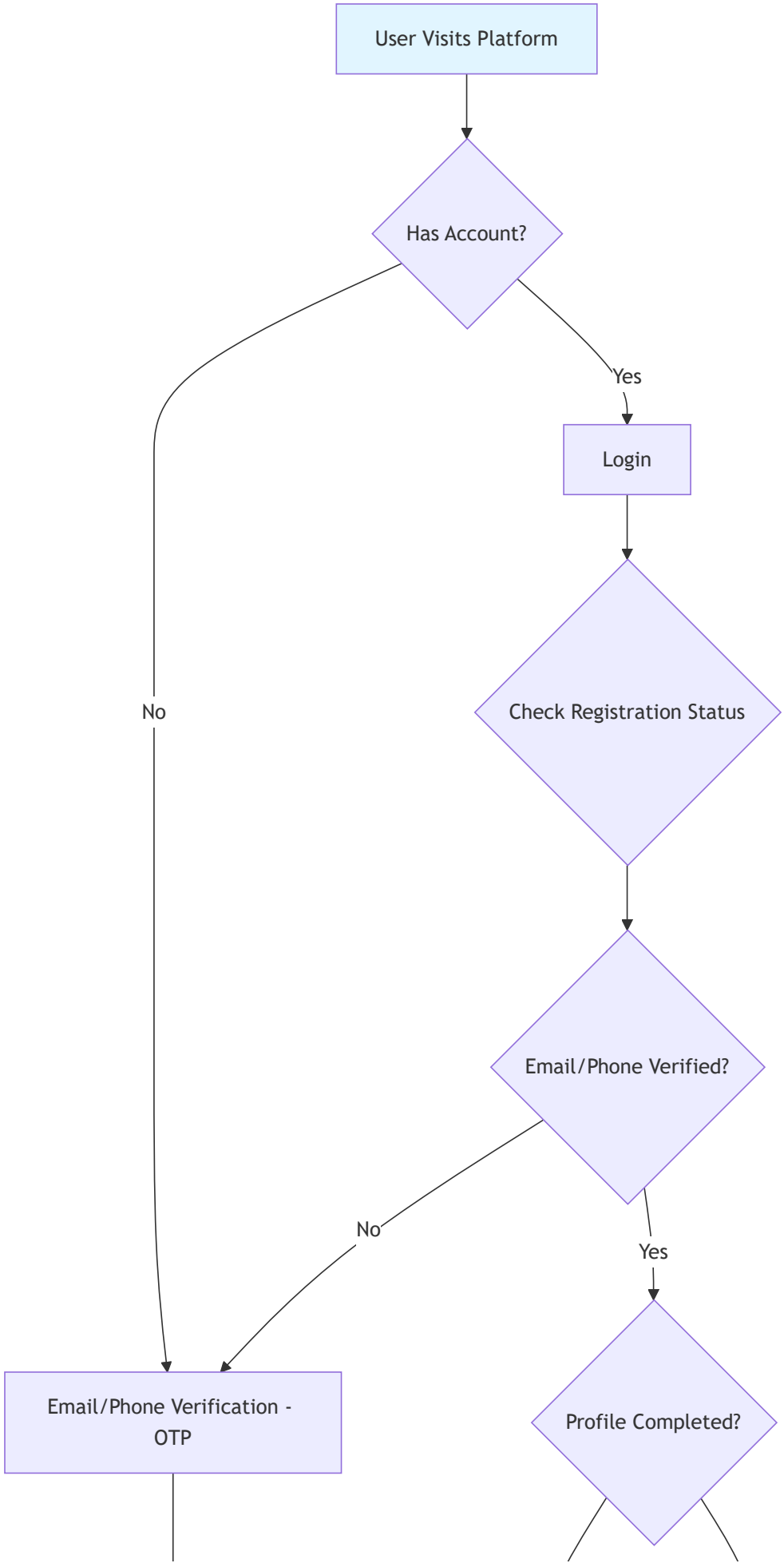
1. Backend System Architecture

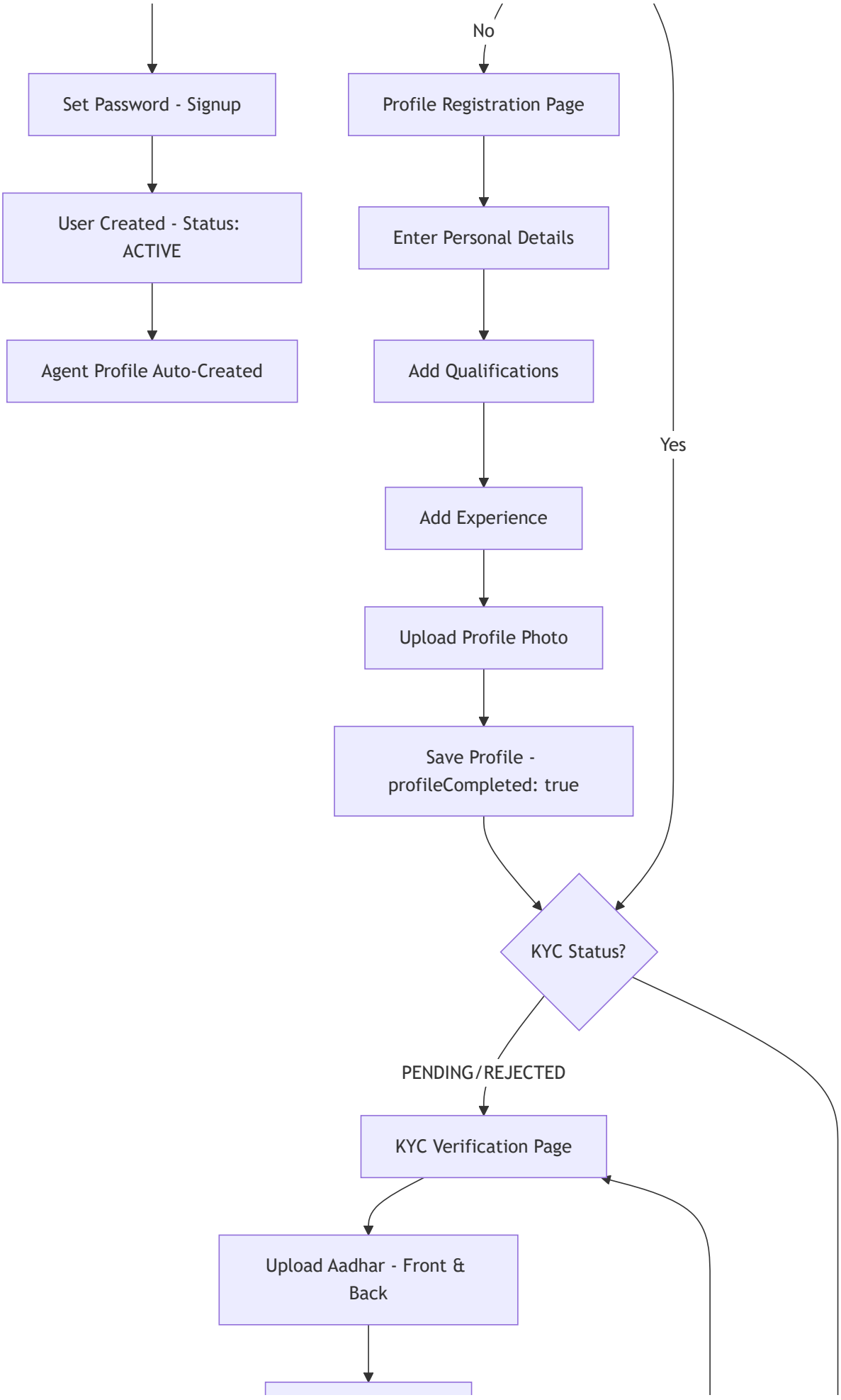


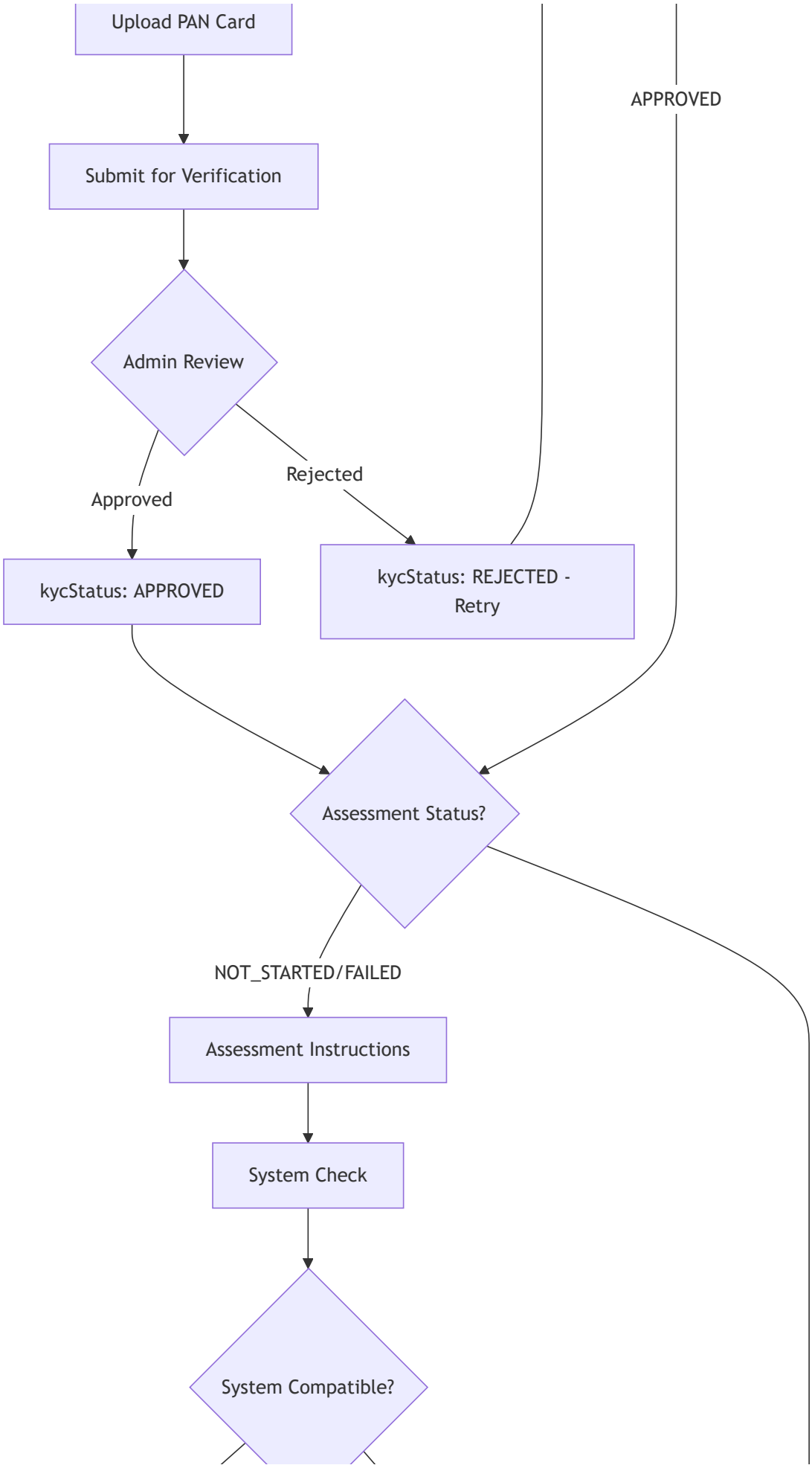
2. Authentication Flow - Signup & Login

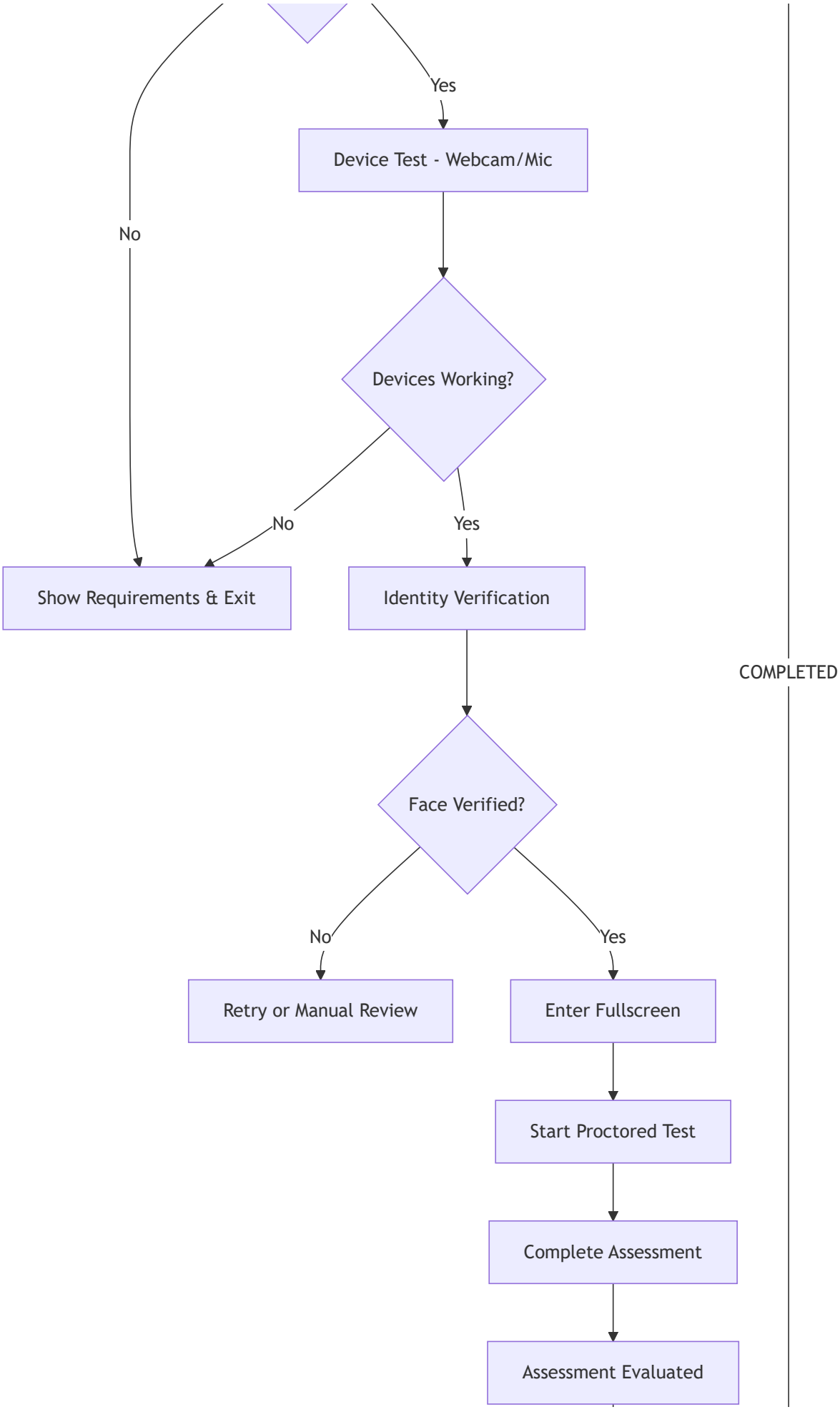


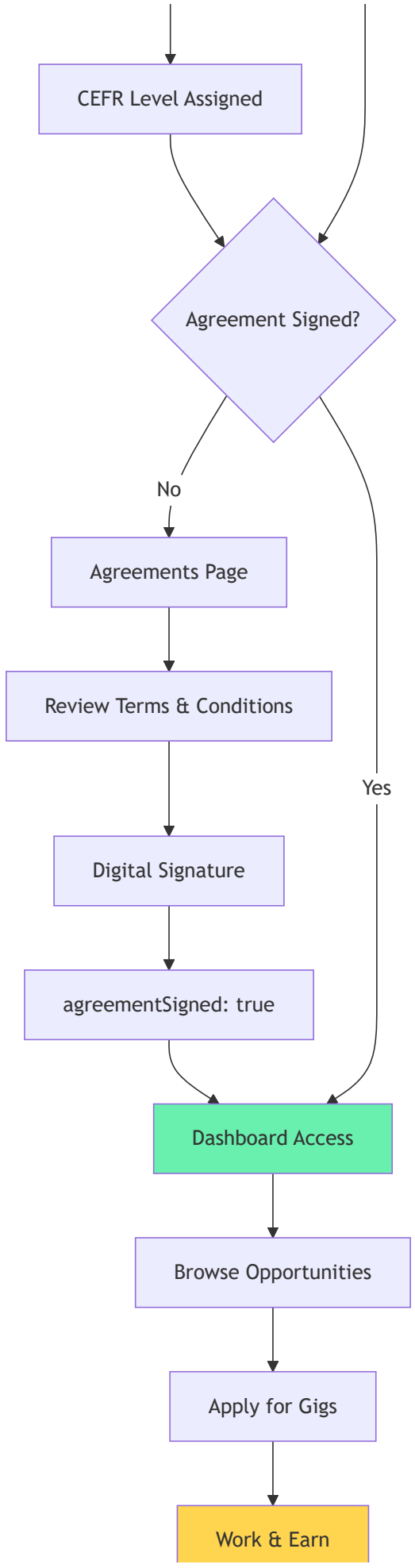
3. Agent Onboarding Flow


User Visits Platform
Has Account?
No
Yes
Login
Check Registration Status
Email/Phone Verified?
No
Yes
Email/Phone Verification - OTP
Profile Completed?

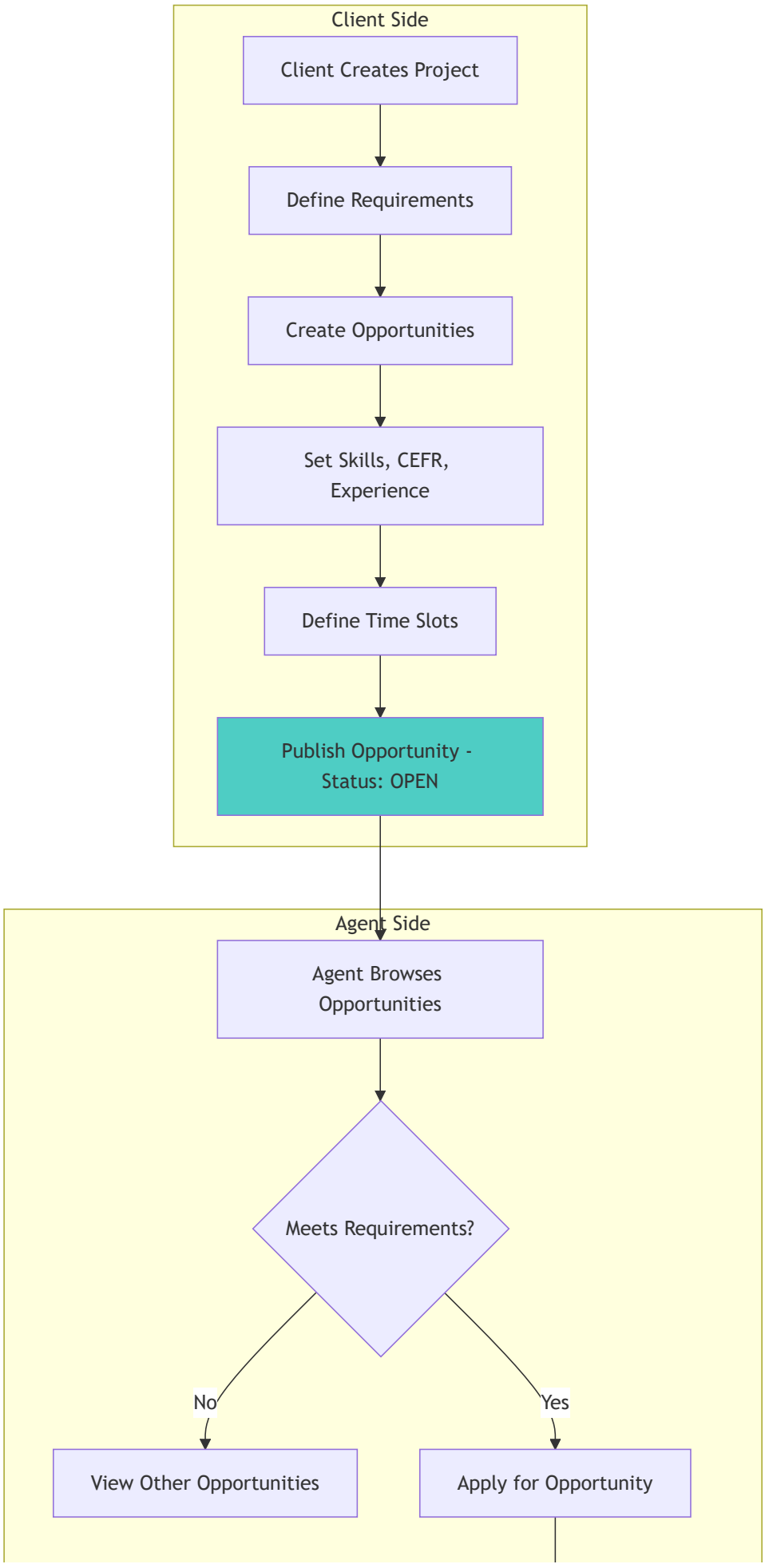

No
Set Password - Signup
Profile Registration Page
User Created - Status: ACTIVE
Enter Personal Details
Agent Profile Auto-Created
Add Qualifications
Yes
Add Experience
Upload Profile Photo
Save Profile - profileCompleted: true
KYC Status?
PENDING/REJECTED
KYC Verification Page
Upload Aadhar - Front & Back

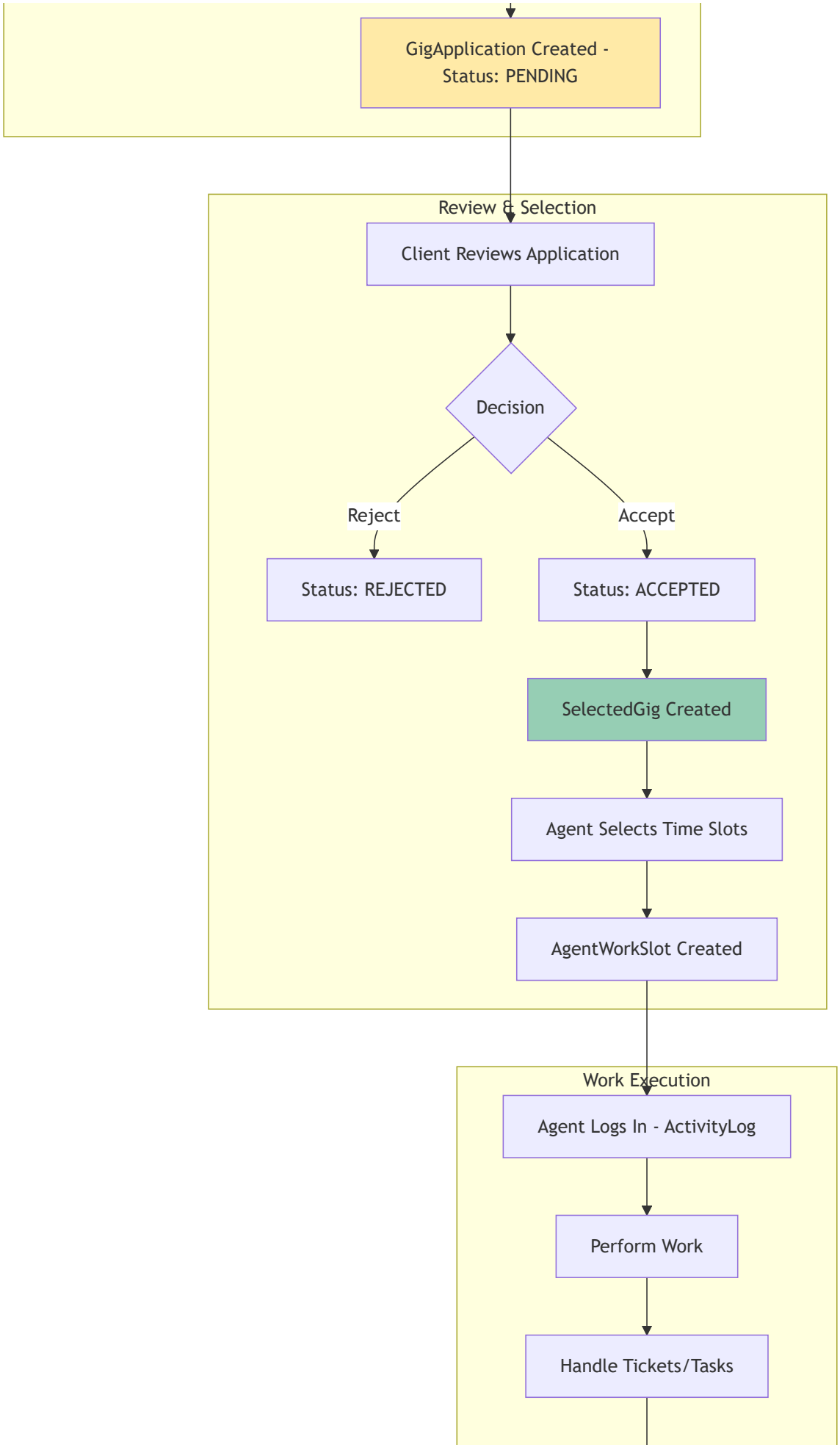

Upload PAN Card
Submit for Verification
Admin Review
Approved
Rejected
kycStatus: APPROVED
kycStatus: REJECTED - Retry
APPROVED
Assessment Status?
NOT_STARTED/FAILED
Assessment Instructions
System Check
System Compatible?

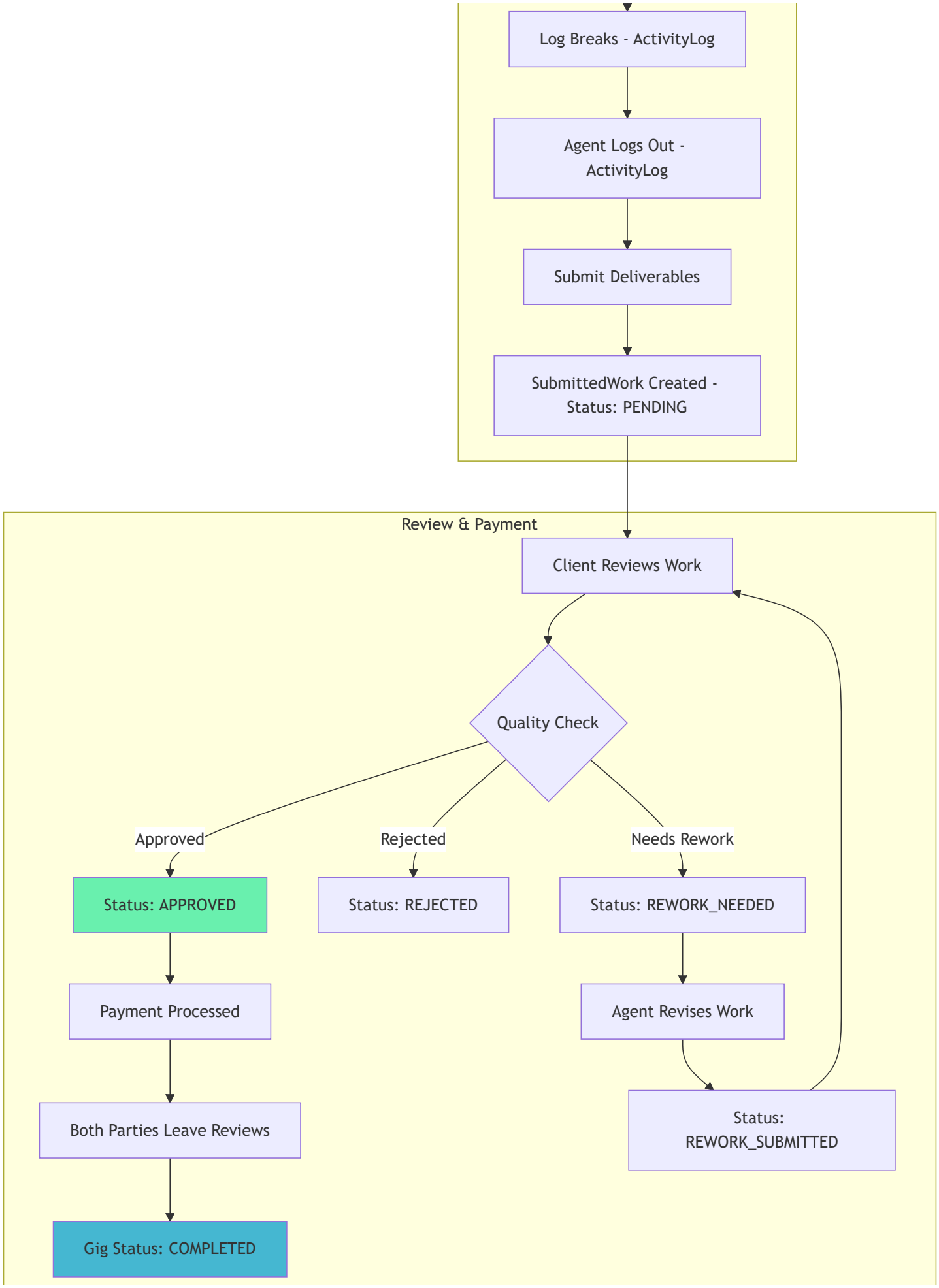

Yes
No
Device Test - Webcam/Mic
Devices Working?
No
Yes
Show Requirements & Exit
Identity Verification
Face Verified?
No
Yes
Retry or Manual Review
Enter Fullscreen
Start Proctored Test
Complete Assessment
Assessment Evaluated
COMPLETED


CEFR Level Assigned
Agreement Signed?
No
Yes
Agreements Page
Review Terms & Conditions
Digital Signature
agreementSigned: true
Dashboard Access
Browse Opportunities
Apply for Gigs
Work & Earn

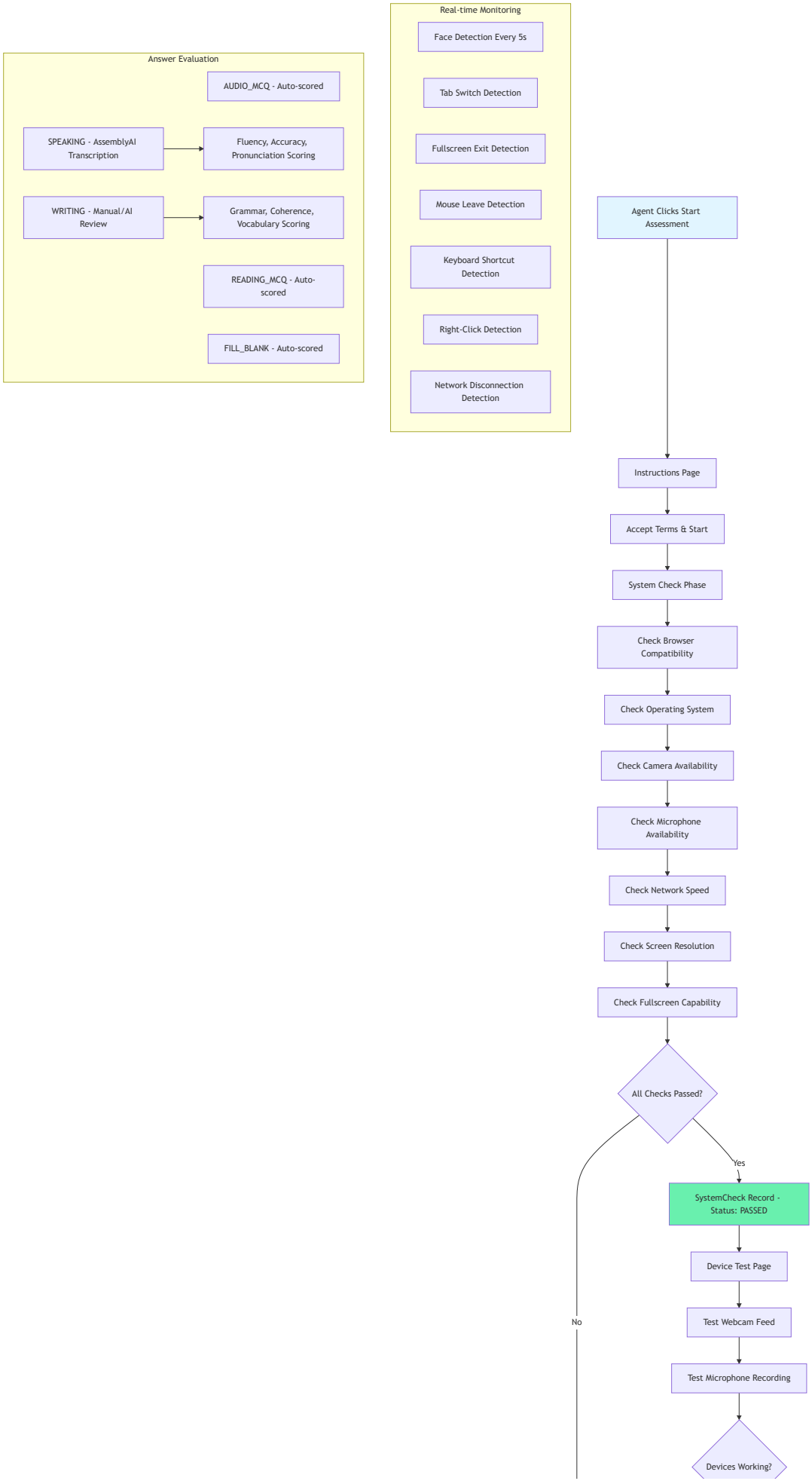
4. Opportunity Application & Gig Flow

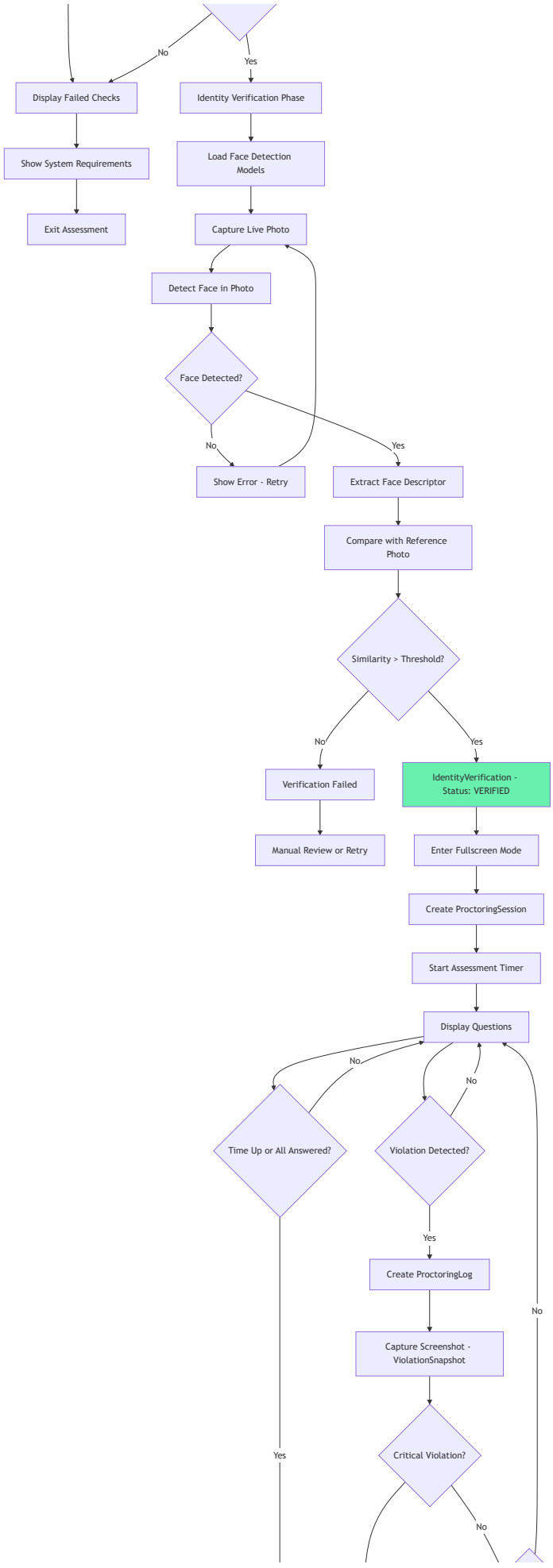

Client Side
Client Creates Project
Define Requirements
Create Opportunities
Set Skills, CEFR, Experience
Define Time Slots
Publish Opportunity - Status: OPEN
Agent Side
Agent Browses Opportunities
Meets Requirements?
No
Yes
View Other Opportunities
Apply for Opportunity

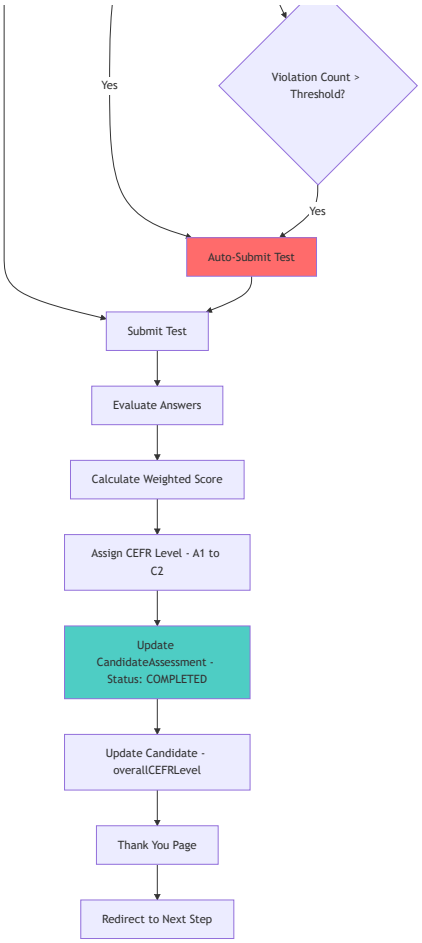

GigApplication Created - Status: PENDING
Review & Selection
Client Reviews Application
Decision
Reject
Accept
Status: REJECTED
Status: ACCEPTED
SelectedGig Created
Agent Selects Time Slots
AgentWorkSlot Created
Work Execution
Agent Logs In - ActivityLog
Perform Work
Handle Tickets/Tasks


Log Breaks - ActivityLog
Agent Logs Out - ActivityLog
Submit Deliverables
SubmittedWork Created - Status: PENDING
Review & Payment
Client Reviews Work
Quality Check
Approved
Rejected
Needs Rework
Status: APPROVED
Status: REJECTED
Status: REWORK_NEEDED
Payment Processed
Agent Revises Work
Both Parties Leave Reviews
Status: REWORK_SUBMITTED
Gig Status: COMPLETED

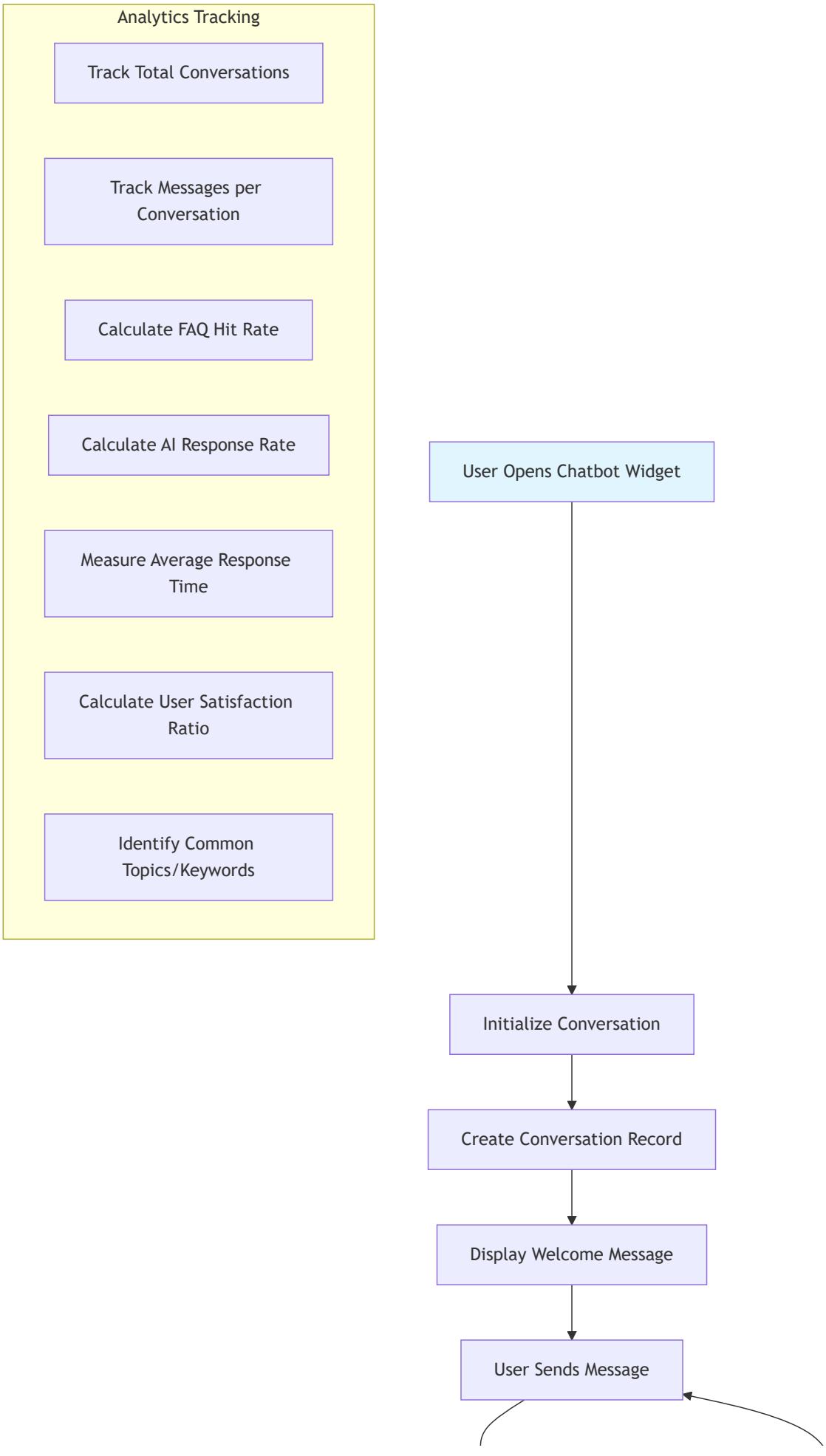
5. Proctoring & Assessment System Flow

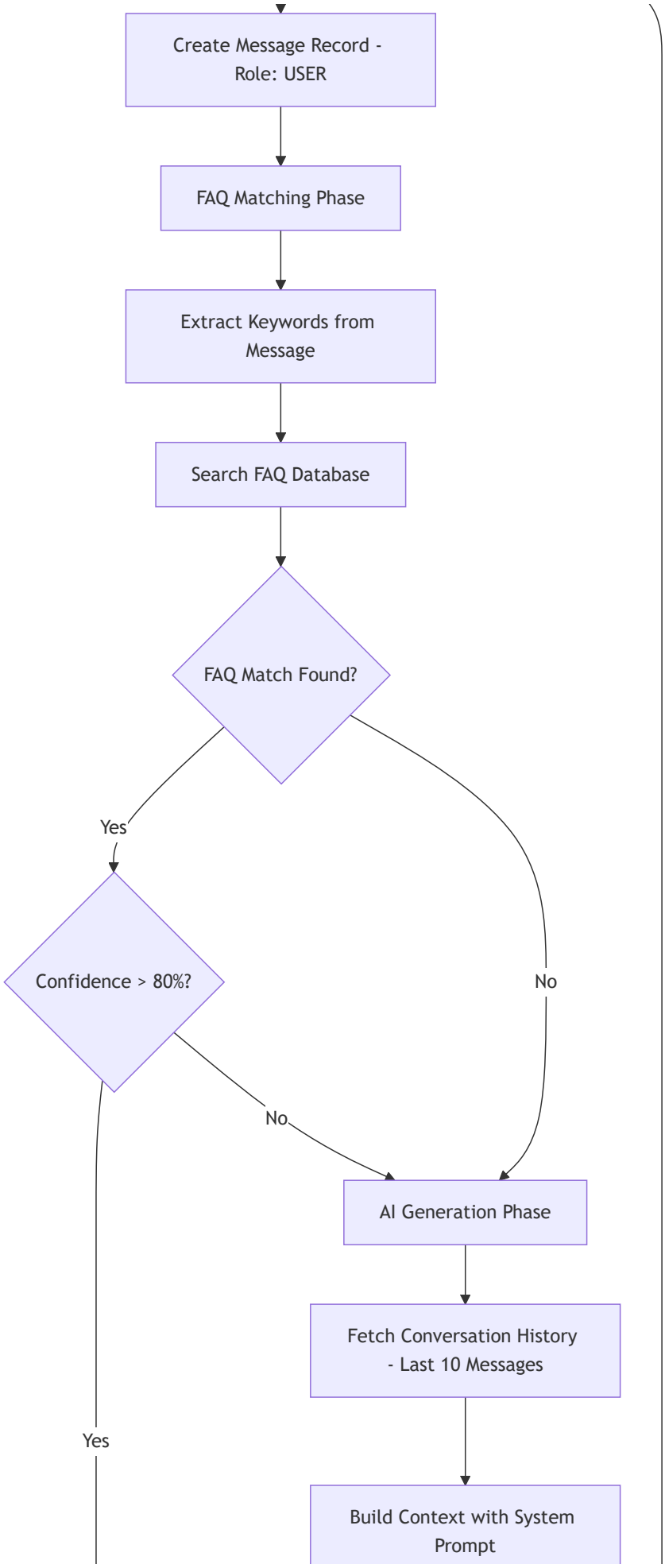

Answer Evaluation
AUDIO_MCQ - Auto-scored
SPEAKING - AssemblyAI Transcription
Fluency, Accuracy, Pronunciation Scoring
WRITING - Manual/AI Review
Grammar, Coherence, Vocabulary Scoring
READING_MCQ - Auto-scored
FILL_BLANK - Auto-scored
Real-time Monitoring
Face Detection Every 5s
Tab Switch Detection
Fullscreen Exit Detection
Mouse Leave Detection
Keyboard Shortcut Detection
Right-Click Detection
Network Disconnection Detection
Agent Clicks Start Assessment
Instructions Page
Accept Terms & Start
System Check Phase
Check Browser Compatibility
Check Operating System
Check Camera Availability
Check Microphone Availability
Check Network Speed
Check Screen Resolution
Check Fullscreen Capability
All Checks Passed?
Yes
No
SystemCheck Record - Status: PASSED
Device Test Page
Test Webcam Feed
Test Microphone Recording
Devices Working?

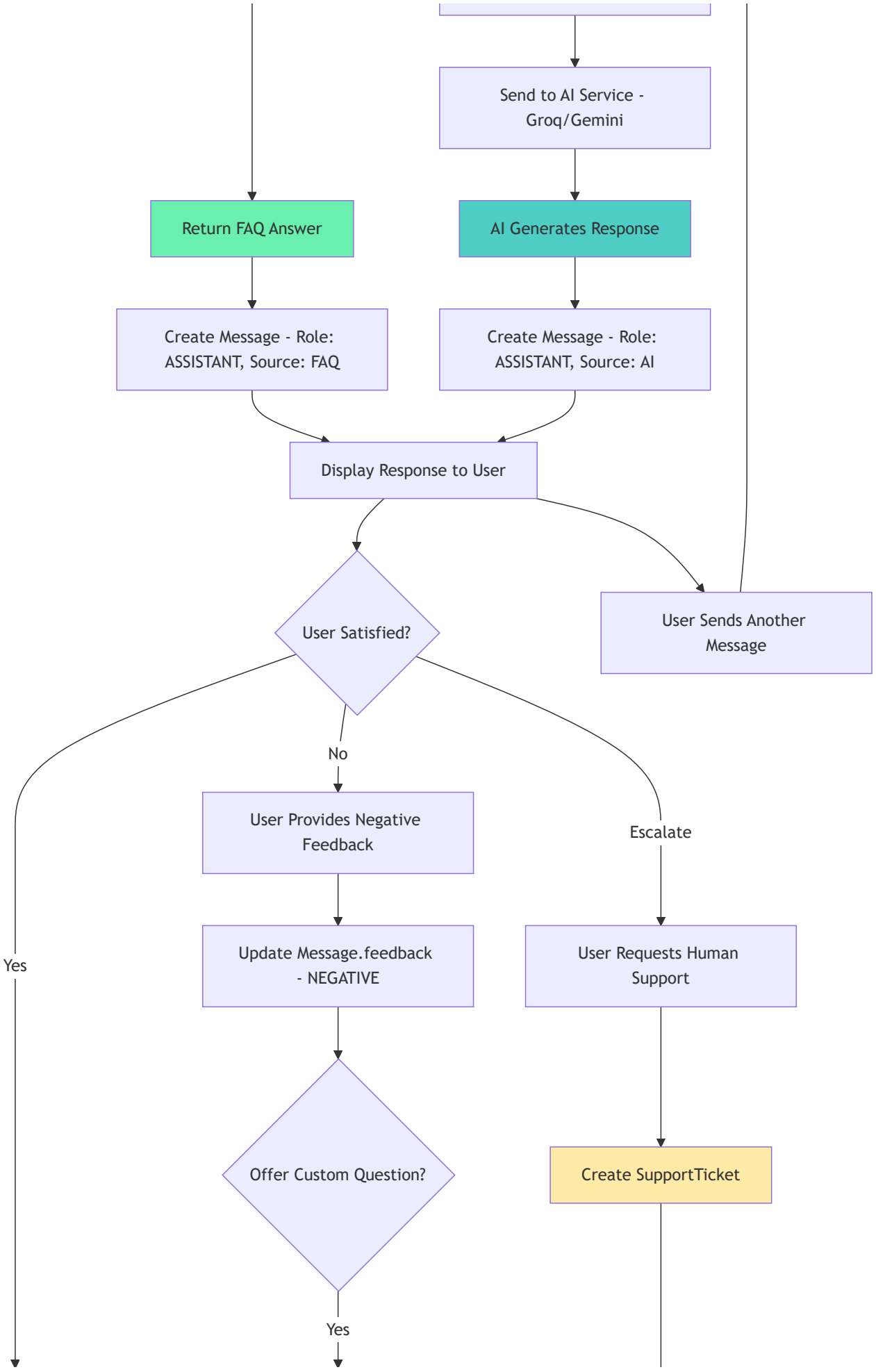

No
Yes
Display Failed Checks
Identity Verification Phase
Show System Requirements
Load Face Detection Models
Exit Assessment
Capture Live Photo
Detect Face in Photo
Face Detected?
No
Yes
Show Error - Retry
Extract Face Descriptor
Compare with Reference Photo
Similarity > Threshold?
No
Yes
Verification Failed
IdentityVerification - Status: VERIFIED
Manual Review or Retry
Enter Fullscreen Mode
Create ProctoringSession
Start Assessment Timer
Display Questions
No
No
Time Up or All Answered?
Violation Detected?
Yes
Create ProctoringLog
No
Capture Screenshot - ViolationSnapshot
Yes
Critical Violation?
No

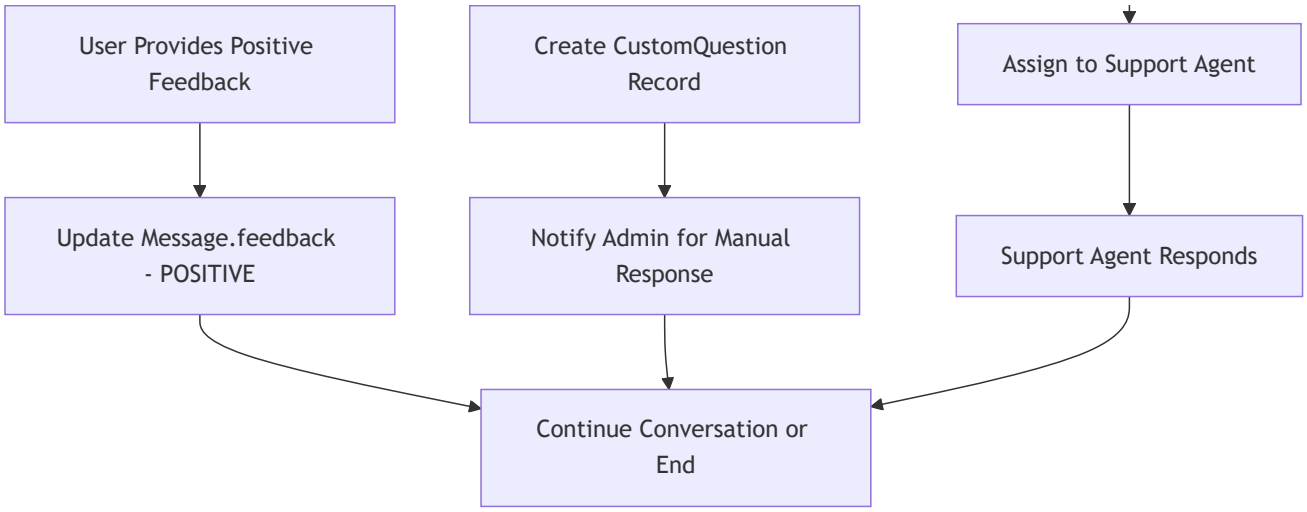


6. Chatbot System Flow

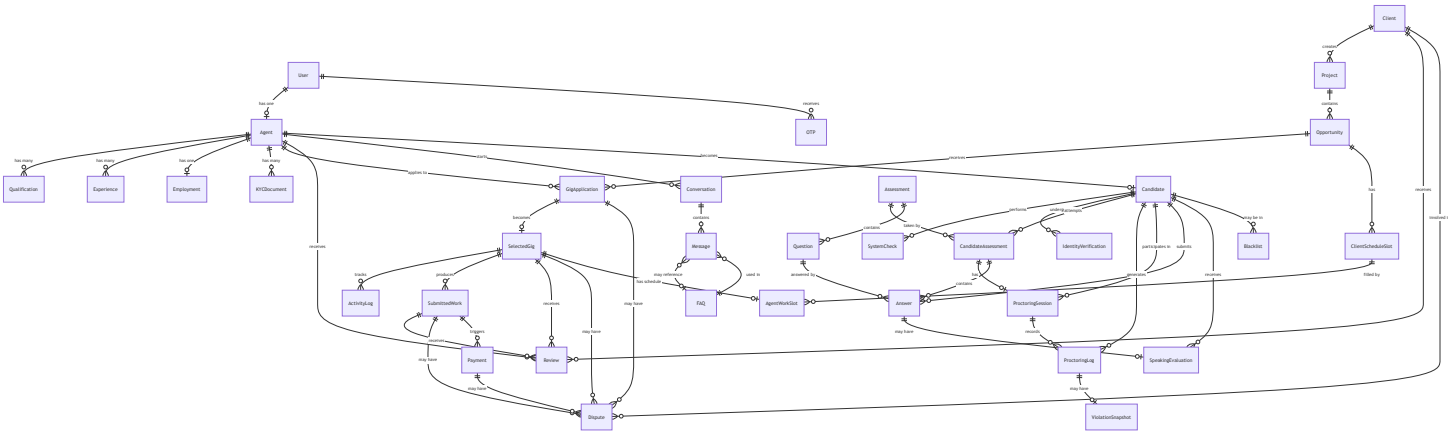

Analytics Tracking
Track Total Conversations
Track Messages per Conversation
Calculate FAQ Hit Rate
Calculate AI Response Rate
Measure Average Response Time
Calculate User Satisfaction Ratio
Identify Common Topics/Keywords
User Opens Chatbot Widget
Initialize Conversation
Create Conversation Record
Display Welcome Message
User Sends Message


Create Message Record - Role: USER
FAQ Matching Phase
Extract Keywords from Message
Search FAQ Database
FAQ Match Found?
Yes
No
Confidence > 80%?
No
Yes
AI Generation Phase
Fetch Conversation History - Last 10 Messages
Build Context with System Prompt

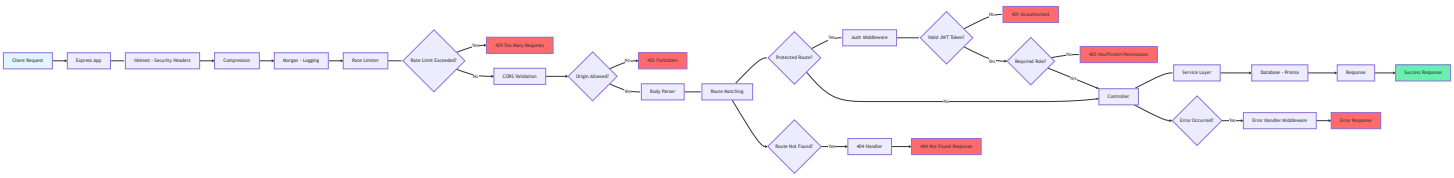

Send to AI Service - Groq/Gemini
Return FAQ Answer
AI Generates Response
Create Message - Role: ASSISTANT, Source: FAQ
Create Message - Role: ASSISTANT, Source: AI
Display Response to User
User Satisfied?
User Sends Another Message
Yes
No
Escalate
User Provides Negative Feedback
Update Message.feedback - NEGATIVE
User Requests Human Support
Offer Custom Question?
Create SupportTicket
Yes



7. Database Schema Relationships



8. API Request Flow with Middleware



Summary

These flowcharts illustrate the complete backend architecture of the HitouchCX platform, including:

1. **System Architecture**: Server initialization, Express configuration, and route organization
2. **Authentication**: Signup and login flows with OTP verification
3. **Agent Onboarding**: Multi-step registration process from signup to dashboard access

4. **Opportunity Management**: Application, selection, work execution, and payment flow
5. **Proctoring System**: Comprehensive assessment flow with real-time monitoring
6. **Chatbot System**: FAQ matching, AI generation, and support escalation
7. **Database Relationships**: Entity relationships across 30+ models
8. **API Request Flow**: Middleware stack and request processing pipeline

The backend is built with security, scalability, and maintainability as core principles, using modern Node.js/Express patterns with Prisma ORM for database management.